Eurobrick Building Systems Ltd
Unit 7
Wilverley Trading Estate
Bath Road
Brislington
Bristol BS4 5NL
Tel: +44 (0)117 971 7117 Fax: +44 (0)117 971 7217
e-mail: info@eurobrick.co.uk
website: www.eurobrick.co.uk

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
13/5079
Product Sheet 1

EUROBRICK CLADDING SYSTEMS

X-CLAD EXTERNAL CLADDING SYSTEM

This Agrément Certificate Product Sheet(1) relates to the X-Clad External Cladding System, an insulated clay brick slip system for use as protective/decorative cladding with or without a cavity over solid masonry, timber- and steel-frame external walls in new and existing domestic and non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Strength and stability — the system can adequately resist wind loads and impact damage (see section 6).

Behaviour in relation to fire — the system is classified Class 0 or 'low risk' surface spread of flame (see section 7).

Thermal properties — the system contributes to the overall thermal performance of the wall construction (see section 9).

Condensation risk — the system can contribute to limiting the risk of interstitial and surface condensation (see section 10).

Weathertightness — the system resists water penetration and the risk of damage to the inner wall (see section 11).

Durability — with appropriate maintenance, the system will remain effective for at least 25 years (see section 13).

The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 6 January 2014

Brian Chamberlain
Head of Approvals — Engineering

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA
tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk
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Regulations

In the opinion of the BBA, the X-Clad External Cladding System, if installed, used and maintained in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A1	Loading
Comment:		The system can sustain and transmit wind loads to the substrate as set out in sections 4.4, 4.5, 4.7 and 6.2 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system meets Class 0 requirement. See sections 7.1 to 7.4, 7.6 and 7.7 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system will resist the passage of rainwater to the supporting structure. See sections 11.1 to 11.5 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system contributes to minimising the risk of surface and interstitial condensation. See sections 10.1 to 10.2 of this Certificate
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system can contribute to meeting this Requirement. See sections 9.1 to 9.4 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable see section 13 and the *Installation* part of this Certificate.
Requirement:	26	CO_2 emission rates for new buildings
Comment:		Walls can contribute to meeting the Target Emission Rate. See sections 9.1 to 9.4 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 12.1, 12.2, 13 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1(b)	Structure
Comment:		The system can sustain and transmit wind loads to the substrate. See sections 4.4, 4.5, 4.7 and 6.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system can contribute to satisfying this Standard, with reference to clauses 2.6.1[(1)(2)], 2.6.2[(1)(2)], 2.6.4[(1)(2)], 2.6.5[(1)] and 2.6.6[(2)]. See sections 7.1, 7.2, 7.4, 7.5 and 7.6 of this Certificate.
Standard:	2.7	Spread to external walls
Comment:		The system can contribute to satisfying this Standard, with reference to clause 2.7.1[(1)(2)]. See sections 7.1 to 7.7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will contribute to meeting this Standard, with reference to clauses 3.10.1[(1)(2)] to 3.10.3[(1)(2)], and 3.10.5[(1)(2)]. See sections 11.1 to 11.5 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy or contribute to satisfying this Standard, with reference to clauses 3.15.1[(1)], 3.15.2[(1)], 3.15.4[(1)] and 3.15.5[(1)]. See sections 10.1 and 10.2 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emission
Standard:	6.2	Building insulation envelope
Comment:		The system will enable, or contribute to enabling, a wall to meet these Standards, with reference to clauses 6.1.1[(1)(2)], 6.1.4[(1)], 6.1.5[(1)], 6.2.1[(1)(2)], 6.2.3[(1)], 6.2.4[(1)(2)], 6.2.5[(1)(2)], 6.2.6[(2)] and 6.2.7[(2)]. See sections 9.1 to 9.4 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The system can contribute to meeting the relevant Requirements of Regulation 9, Standards 1 to 6, and, therefore, will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4[(1)(2)] [Aspects 1[(1)(2)] and 2[(1)]], 7.1.6[(1)(2)] [Aspects 1[(1)(2)] and 2[(1)]] and 7.1.7[(1)(2)] [Aspect 1[(1)(2)]]. See section 9.1 to 9.4 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this system under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1[(1)(2)], such standards to be applied as defined by Schedule 6[(1)(2)].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		This system is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		The system will contribute to meeting this Regulation. See sections 11.1 to 11.5 of this Certificate.
Regulation:	29	Condensation
Comment:		The system will satisfy the requirements of this Regulation. See sections 10.1 and 10.2 of this Certificate.
Regulation:	30	Stability
Comment:		The system is acceptable as set out in sections 4.4, 4.5, 4.7 and 6.2 of this Certificate.
Regulation:	36	External fire spread
Comment:		The system is judged to meet this requirement. See sections 7.1 to 7.4, 7.6 and 7.7 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
	40(2)	Target carbon dioxide Emissions Rate
Comment:		The system will contribute to a building satisfying its target emission rate. See section 9.1 to 9.4 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1) and 15 *Installation* (15.4) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of the X-Clad External Cladding System, when installed with a minimum cavity width of 15 mm (see Figure 2b), when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.2 *External timber framed walls*, Chapter 6.9 *Curtain walling and cladding* and Chapter 6.10 *Light steel framed walls and floors*.

Technical Specification

1 Description

1.1 The X-Clad External Cladding System (see Figure 1) comprises:

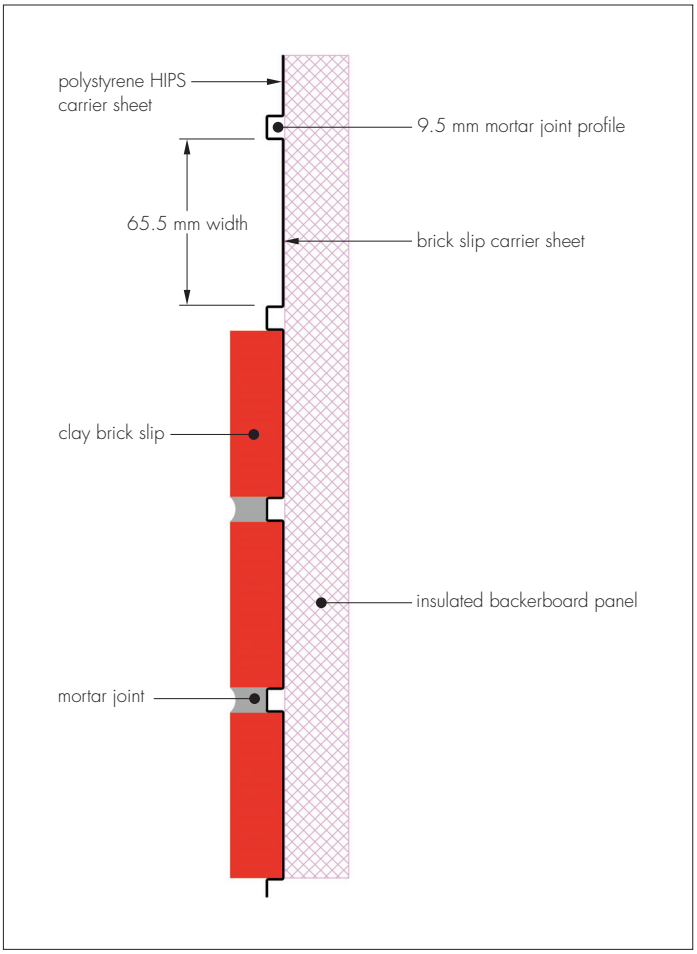
- insulated backerboard panels — 1200 mm wide by 2400 mm high composite panels consisting of a high-impact, high-gloss white polystyrene (HIPS) profiled brick slip carrier sheet, bonded to a 17.5 mm, 25 mm or 50 mm thick extruded polystyrene (XPS) insulation board with a two part polyurethane adhesive. The XPS insulation is manufactured in accordance with BS EN 13164 : 2012 and with the properties shown in Table 1. The brick slip carrier sheet provides a horizontal joint spacing track for brick slips with track dimensions of 65.5 mm high with a 9.5 mm raised mortar joint profile as standard

Table 1 Backerboard properties

Performance characteristic	Value
Density (kg·m^3)	28–34
Insulation compressive strength at 10% compression to BS EN 826 (kPa)	200 (declared value)

- clay brick slip — fired clay brick slips of nominal size 215 mm length, 65 mm height and 15 mm thickness, and available in a range of colours. The brick slips are either extruded (Britannia range) or cut (Classic range) from masonry units CE marked in accordance to EN 771-1 : 2011 as suitable for use in 'severe exposure' conditions (designation F2). In addition, L-shaped bricks 215 mm by 65 mm by 102 mm are available for external corners
- brick slip adhesive — Korapur 126 is a one-part polyurethane construction adhesive specified in accordance with BS 6213 : 2000 + A1 : 2010 and used to attach the brick slips to the panel
- pointing grout/mortar — joints between brick slips are filled with proprietary cementitious mortar mix. Joints below damp-proof course level may require a higher strength mortar to protect against potential degradation from frost attack. Mortar mixes must be selected in accordance with class 12, 6 or 4 BS EN 998-2 : 2010.

Figure 1 X-Clad External Cladding System



1.2 Ancillary components for use with the system, but outside the scope of the Certificate, include:

Backerboard panel fasteners — steel fixings suitable for the substrate incorporating a 45 mm diameter plastic nylon retaining washer used to attach the panel

Base angle — polymer-coated aluminium base angle with size chosen to suite thickness of panel used. This is supplied in 2500 mm lengths for cutting on site to provide a fixed datum for setting out panels

Urethane-based sealant — for use around openings and penetrations in accordance with BS EN ISO 11600 : 2003 + A1 : 2011 and BS 6213 : 2000 + A1 : 2010

Breather membrane — for use on the external side of framed substrate applications

Damp proof courses

Timber battens — 40 mm by 25 mm battens used at maximum of 400 mm centres to support sheathing in cavity applications

Sheathing — cement particle board used on the external side and timber or cement particle board used on internal side of cavity applications.

2 Manufacture

2.1 The extruded polystyrene insulation component of the panel is manufactured to comply with BS EN 13164 : 2012. The high impact polystyrene profiled carrier sheet component is vacuum formed. Panels are produced by factory bonding the XPS insulation to the profiled carrier sheet using a two part spray polyurethane adhesive. Fastening washers from nylon material are injection moulded

2.2 Clay brick slips are either extruded or cut slips to specified dimensions

2.3 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the Certificate holder/manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of non-conformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis as part of a surveillance process to ensure that standards are maintained and that the product or system remains as Certificated.

2.4 The management system of Eurobrick Systems Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by CQS (Certificate No GB2003636).

3 Delivery and site handling

3.1 The Panels are stacked on timber pallets. Each pack contains a label incorporating the manufacturer's name, product name, edge type, thickness, width, length, number of panels per pallet, pallet weight, recommended storage, handling method, appropriate classification to BS EN 15283-1 : 2008 + A1 : 2009 and the CE marking.

3.2 During transportation, an impermeable cover should be used to protect the panels.

3.3 Panels must be stored flat, level, clear of the ground on pallets out of direct sunlight and in dry conditions. Panels should ideally be stored indoors, however, should short-term storage outdoors be necessary, they must be covered with tarpaulin. Panels must not be exposed to volatile organic solvents. When moving manually, individual panels should be maintained in a vertical position.

3.4 Clay brick slips are delivered to site in shrink wrapped bundles on pallets. They must be stored covered and on dry level ground.

3.5 Containers of adhesive, mortar, sealants and expanding foam should be stored in dry conditions and protected against frost and excessive heat. Adhesive and mortar must be used within the date indicated on the packaging or the supplier's guidelines.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the X-Clad External Cladding System.

Design Considerations

4 General

4.1 The X-Clad External Cladding System is suitable for use as a non-structural weather-resistant, thermally insulating external wall façade panel system to provide a protective and decorative cladding finish for new or refurbished buildings less than 18 m in storey height of solid and cavity masonry, dense or no-fines concrete, timber-frame or light-gauge steel-frame construction with or without a cavity behind the system (see Figure 2). The system is restricted to sheltered areas (on timber/steel frame walls) and moderate areas (on masonry walls) where used without a cavity behind the system (see section 10.2)

4.2 The system can be used above and below the damp-proof course (see Figure 5). However, when used below the dpc, suitable brick slips and mortars must be specified in accordance with the Certificate holder's advice to resist the higher moisture levels.

4.3 The system will improve the weather resistance and reduce thermal transmission of a wall and provide a decorative finish. However, it may only be installed where other routes for moisture penetration have been dealt with separately and where dampness, other than that caused solely by condensation, is not evident on the inner surface of the wall. The system can contribute to minimising condensation on internal wall surfaces.

4.4 Existing buildings subject to national Building Regulations should have wall surfaces in accordance with section 4.7 of this Certificate.

4.5 New buildings subject to national Building Regulations should be constructed in accordance with the relevant recommendations of:

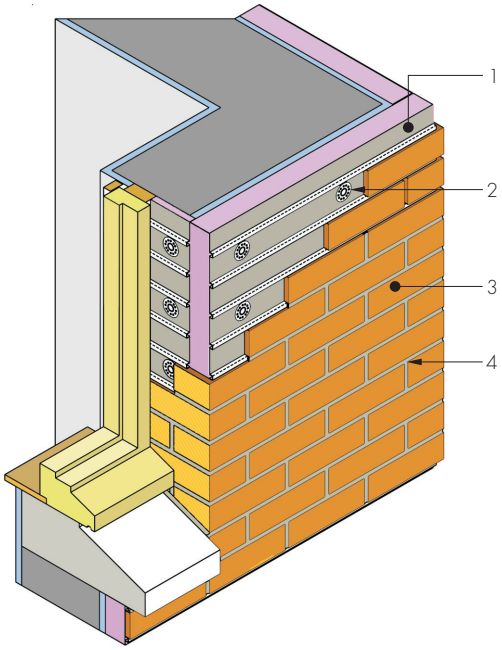
- BS EN 1996-1-1 : 2005 + A1 : 2012, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006
- BS 8000-3 : 2001.

4.6 Other buildings, not subject to any of the previous requirements should also be built in accordance with requirements given in section 4.5.

4.7 The wall and support frame to which the cladding is to be fixed should be structurally sound and constructed in accordance with the requirements of the relevant national Building Regulations and national standards:

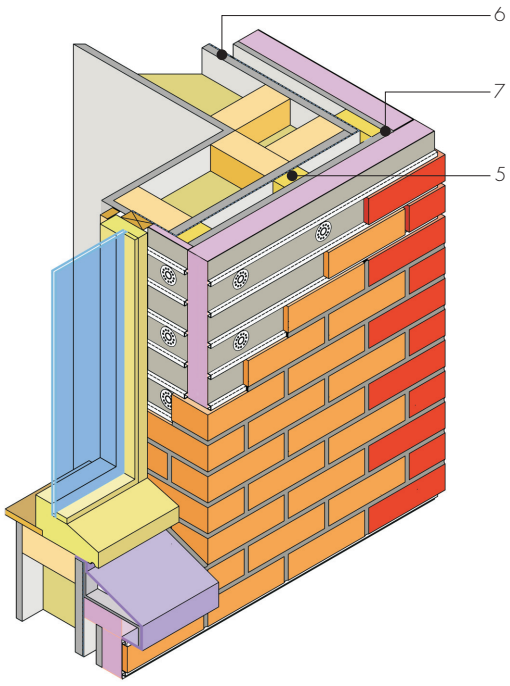
- timber stud walls and timber battens must be structurally sound, designed and constructed in accordance with BS EN 1995-1-1 : 2004 + A1 : 2008, and preservative treated in accordance with BS EN 351-1 : 2007
- galvanized steel framework must be structurally sound, designed and constructed in accordance with BS EN 1993-1-1 : 2005 and BS EN 1993-1-3 : 2006
- new masonry buildings subject to national Building Regulations should be constructed in accordance with the relevant recommendations of BS EN 1996-1-1 : 2005 + A1 : 2012, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006.

Figure 2 Typical X-Clad External Cladding System

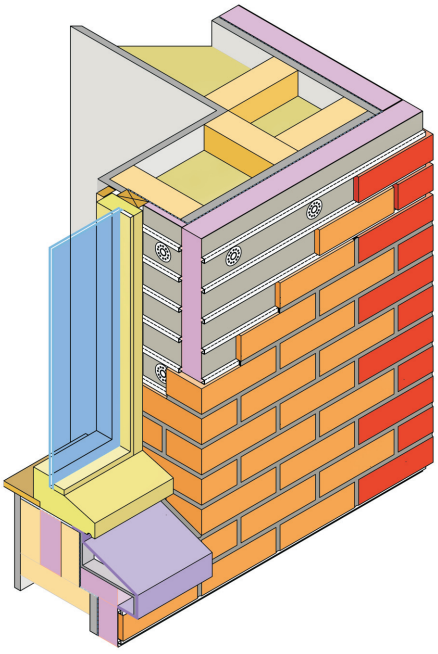


(a) masonry substrate

1 insulated backerboard panel
2 backerboard panel fastener
3 clay brick slip
4 pointing mortar
5 40 mm x 25 mm timber battens
6 sheathing
7 cement particle board sheathing



(b) timber frame substrate (with cavity)



(c) timber frame substrate (without cavity)

4.8 The system transfers its self-weight and design wind loads to the substrate wall. The substrate and any supporting framework should be capable of resisting the associated loads. Particular care is required around window and door openings to ensure that the structure is capable of sustaining the additional weight of the system.

4.9 The system does not make any contribution to the overall structural performance of the building and must not be used for the support of any temporary structure.

4.10 In very severe exposure conditions, application of a high performance breather membrane should be considered.

4.11 The system must only be used in locations where the surface temperature will not exceed 65°C.

4.12 All externally exposed perimeters and penetrations of the panel must be sealed.

4.13 The fixing of rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items is outside the scope of this Certificate.

5 Practicability of installation

The system should only be installed by installers who have been trained and approved by the Certificate holder.

Note: The BBA operates a UKAS Accredited Approved Installer Scheme for external wall insulation; details of installer companies approved are included on the BBA's website www.bbacerts.co.uk '

6 Strength and stability

6.1 A suitably qualified and experienced individual must check the design and installation of the cladding system to provide adequate resistance to design loads applicable in the UK.

6.2 Design wind actions should be calculated in accordance with BS EN 1991-1-4 : 2005 + A1 : 2010 and the UK National Annex. Due consideration should be given to the higher pressure coefficients applicable to corners of the building as recommended in this standard.

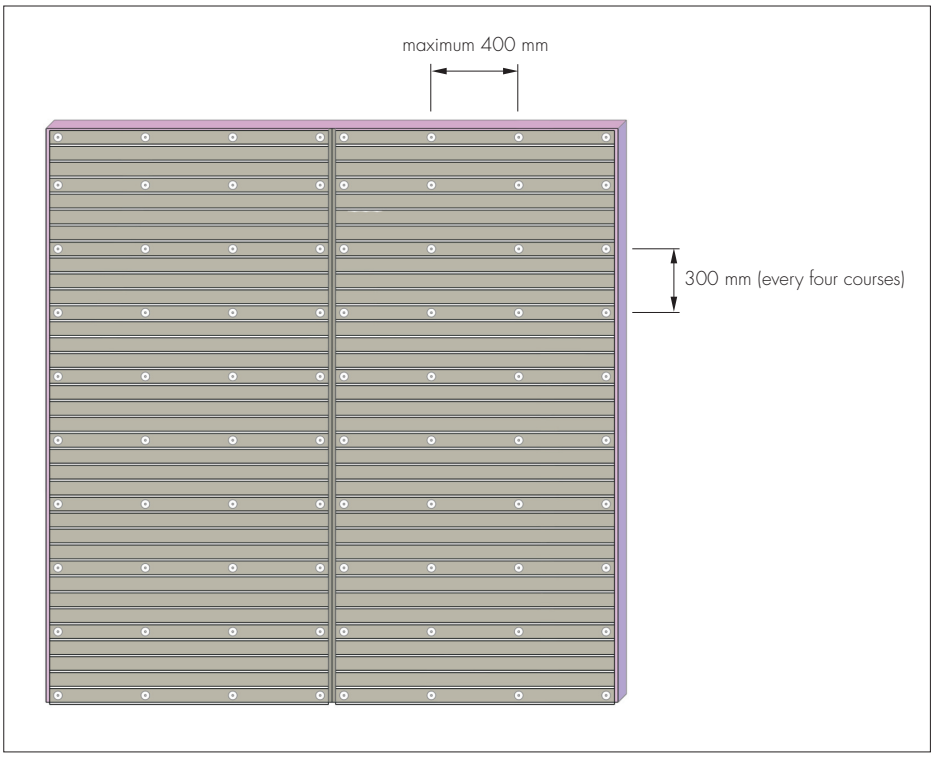
6.3 The substrate wall must be able to take the full wind, as well as any racking loads on its own. No contribution from the cladding system may be assumed in this regard.

6.4 Positive wind load (pressure) is transferred to the substrate wall directly via bearings and compression of the brick slips and panel.

6.5 Negative wind pressure (suction) is resisted by the bond between each component. The panel is retained by fixings.

6.6 The structural adequacy of the fixings used to attach the panel to the substrate wall, including their pull-out strength, will depend on the type and condition of the individual substrate wall and must therefore be designed and selected on a project specific basis. The maximum spacing between these fixings should not exceed 400 mm and 300 mm horizontally and vertically respectively, as shown in Figure 3. Spacing of fixings around edges at openings should be reduced to 150 mm centres.

Figure 3 Typical fixing layout



6.7 When installed in accordance with the requirements of this Certificate and the Certificate holder's instructions, systems incorporating the panels will withstand, without damage or permanent deformation, wind pressure or suction not exceeding 2 $kN \cdot m^{-2}$.

6.8 The studs and support rails (the supporting framework) should be designed to limit the deflection to the lesser of 1/350 of its span or 15 mm.

6.9 The designer must ensure the following:

- the substrate wall has adequate strength to resist additional loads that may be applied as a result of installing the system, ignoring any contribution from the cladding system itself
- the proposed system and associated fixings (see section 1.2) and fixing pattern (see section 6.6) provide adequate resistance to negative wind loads
- the design pull-out values (based on site tests) provides adequate pull-out capacity of the fixings (not covered by this Certificate). The maximum allowable pull-out value of the fixing to be used for securing the panel to the structural substrate should be determined by tests using a minimum safety factor of 3 on the characteristic failure load or by a method agreed by the engineer responsible.

Impact resistance

6.10 When tested[1] for hard body and soft body impact without a cavity, the system achieved adequate resistance to impact and is therefore suitable for use in external walls in category I to category III[2]

(1) These tests (450 mm stud centres) were conducted in accordance with BS 8200 : 1985

(2) The use categories are defined in ETAG 004 as:

- Use category I — a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use
- Use category II — a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the system will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care
- Use category III — a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

6.11 For cavity installations, impact tests must be conducted to ETAG 004 or other similar current Standards to verify suitability for use.

7 Behaviour in relation to fire

7.1 The surface spread of flame classification for the system is Class 0 or 'low risk' as defined in the Building Regulations.

7.2 The XPS insulation material has reaction to fire classification of F in accordance with BS EN 13501-1 : 2007.

7.3 The system is restricted for use in buildings less than 18 m in height.

7.4 For houses[1] in Scotland and for all buildings in England and Wales and Northern Ireland, the system is suitable for use on, or at any distance from the boundary.

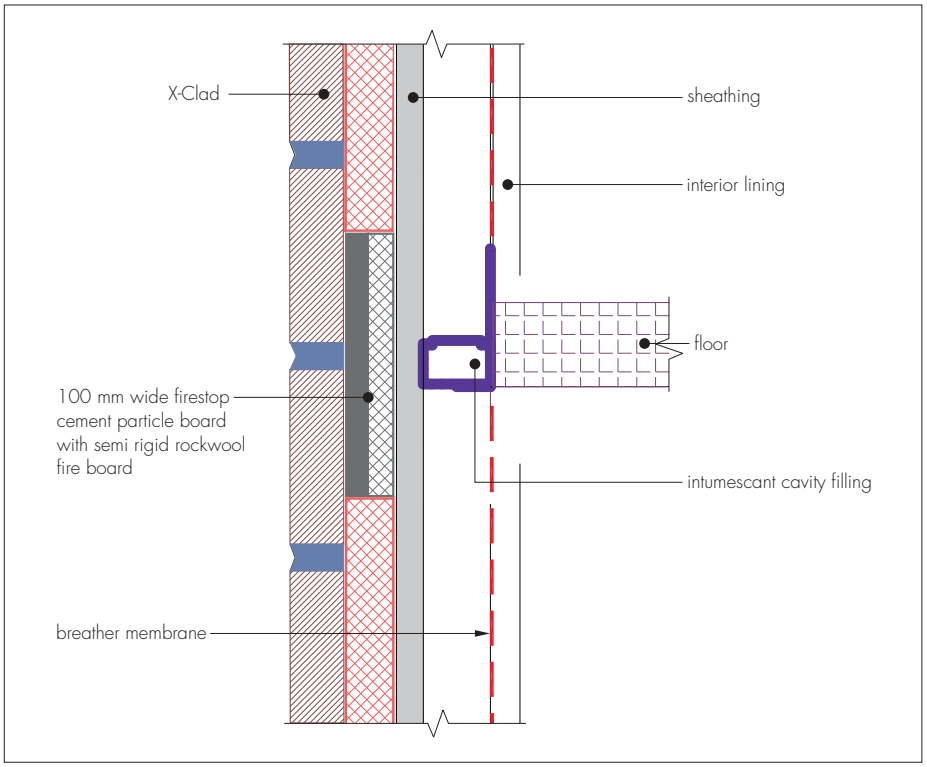
(1) 'house' means a dwelling on one or more storeys either detached or forming part of a building from all other parts of which it is divided on vertically.

7.5 For flats and maisonettes and non-domestic buildings in Scotland, the system is suitable only for use more than 1 m from the boundary.

7.6 The system is not classified as 'non-combustible' therefore, calculations for unprotected areas may apply dependant on the fire resistance characteristics of the wall.

7.7 For application to second storey walls and above, it is recommended that the designer includes at least one stainless steel fixing per square metre and fire barriers in line with compartment walls and floors as advised in BRE Report 135: 2013 (see Figure 4).

Figure 4 Cavity/Fire barriers



8 Proximity of flues and appliances

When the system is installed in close proximity to certain flue pipes the relevant provisions of the national Building Regulations should be met:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.4[1][2]

Northern Ireland — Technical Booklet L.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

9 Thermal properties

9.1 The system provides additional thermal resistance to an external wall. Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report 443 : 2006 using the insulation thermal conductivity (λ_D value) of 0.033 $W \cdot m^{-1} \cdot K^{-1}$ for extruded polystyrene foam insulation.

9.2 The U value of a completed wall will depend on the selected insulation thickness, the number, type and method of fixings, the insulating value of the substrate wall and its internal finish. The thermal resistance of the system is primarily dependent upon the extruded polystyrene foam insulation element as indicated in Table 1. Extra insulation is required to achieve the level of thermal performance required by the Regulations.

Table 1 Contribution of thermal performance of X-Clad External Cladding System

Component (thickness) (	Thermal resistance ($m^2 \cdot K \cdot W^{-1}$)	Fixing diameter (mm)[1]
polystyrene (17.5 mm)	0.530	3.5
polystyrene (25 mm)	0.757	4.2
polystyrene (50 mm)	1.515	5.0
brick slip (15 mm)	0.019	–

(1) For the purpose of U value calculations allowance must be made for 12 nylon and 1 stainless steel fixing per square metre having the diameters shown above.

9.3 The systems can contribute to maintaining continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details, the corresponding psi values in BRE Information Paper IP 1/06, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and, for new thermal elements to existing buildings, Accredited Construction Details (version 1.0) (for new-build, see also SAP 2009, Appendix K, and the *iSBEM User Manual*)

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

9.4 In conjunction with a substrate wall providing the required airtightness, the panels can contribute to the requirement for limiting heat loss through the building fabric and achieving the Target Emission Rate.

10 Condensation risk

10.1 Designers must ensure that an appropriate condensation risk analysis has been carried out for all parts of construction, including openings and penetrations at junctions between the insulation system, to minimise the risk of condensation. The recommendations of the BS 5250 : 2011 should be followed, including requirements for vapour control layers and breather membranes in timber frame construction applications.

10.2 For installation without a cavity the system is limited to sheltered areas (wind-driven rain less than 33 $l^{-1} \cdot m^2$ per spell) when used in conjunction with timber or steel framed substrate walls, and limited to moderate areas (wind-driven rain less than 56.5 $l^{-1} \cdot m^2$ per spell) when used in masonry walls. A map detailing the UK zones for exposure to driving raining can be found in Approved Document C. The wind-driven rain index can be more accurately calculated from the large scale maps and correction factors given in BS 8104 : 1992

10.3 It is essential that walls incorporating the product are rain resistant and show no sign of water ingress. Careful attention has to be paid to joints and junctions in and between components and elements.

10.4 Dynamic simulations to BS EN 15026 : 2007 indicate that the product is acceptable when installed creating a rain resistant wall. The simulations were done for a particular location, orientation and vapour resistance of the masonry substrate. The suitability of other constructions/parameters may be assessed by using an appropriate dynamic modelling package.

10.5 The risk of interstitial condensation in the external walling is greatest when the building is drying out after construction. Guidance on preventing condensation is given in BRE Digest 369 and BRE Report 262 : 2002.

10.6 The water vapour resistance factors (μ) for XPS is 183.58 $MN \cdot s \cdot g^{-1}$.

11 Weathertightness

11.1 The system resists the passage of moisture from the ground and from weather. Any water collecting in the cavity due to rain or condensation will be drained through openings at the base of each closed section of cavity.

11.2 The brick slips are classified as being F2 for resistance to freeze thaw, in accordance with DD CEN/TS 772-22 : 2006 and, therefore, is suitable for conditions of severe exposure.

11.3 For the cavity installation on timber-frame and steel-frame constructions, the cavity should be at least 15 mm wide. The cavity must be drained and vented, incorporating perpend weep vents at 1.5 m centres, as defined in BS EN ISO 6946 : 2007. Ventilation and drainage openings should be suitably protected, or baffled, to prevent the ingress of birds, vermin and rain.

11.4 At the top of walls, the system should be protected by an adequate overhang or other detail designed for use with this type of system (see sections 16.12).

11.5 Designers and installers should take particular care in detailing around openings, penetrations and movement joints to minimise the risk of rain ingress.

12 Maintenance

12.1 Regular maintenance inspections should be carried out to ensure that the ingress of water does not occur. Necessary repairs must be effected immediately. Annual inspections should be carried out to ensure the condition of sealants is satisfactory. Sealant should be reapplied where necessary. Damaged brick slips should be replaced in accordance with Certificate holder's installation instructions.

12.2 The brick finish may become soiled over time. For normal soiling, the surface may be cleaned using a hot water/household detergent mix, applied with a suitable cleaning pad or sponge. For more difficult chemical soiling, the advice of the Certificate holder should be sought.

13 Durability

The durability and service life of the cladding panels will depend upon the building location and height, intended use of the building and the immediate environmental conditions to which it is exposed. Providing regular maintenance is carried out as described in section 12 and in accordance with the Certificate holder's instructions, the system should have an ultimate service life of over 25 years.

Installation

14 Approved installers

Application of the system, within the context of this Certificate, is carried out by approved installers recommended or recognised by the Certificate holder. Such an installer is a company:

- employing operatives who have been trained and approved by the Certificate holder to install the system
- which has undertaken to comply with the Certificate holder's application procedure, containing the requirement for each application team to include at least one member operative trained by the Certificate holder
- subject to at least one inspection per annum by the Certificate holder to ensure suitable site practices are being employed. This may include unannounced site inspections.

15 General

15.1 The X-Clad External Cladding System must be installed in accordance with the Certificate holder's recommendations, the requirements of this Certificate and the specification laid down by the consulting engineer.

15.2 A dpc must be provided through the thickness of the system. In new constructions, the dpc in the substrate should be carried through the system. In existing buildings, an appropriate dpc must be fitted in line with the existing dpc.

15.3 When fixed to a framed substrate, a suitable breather/vapour permeable membrane must be applied to the sheathing board.

15.4 The panels can be handled on site and can be cut or trimmed using a sharp knife or fine-toothed saw. Reasonable precautions must be taken to ensure panels are not damaged during and subsequent to installation. Protective glasses and masks must be worn when cutting the panels.

16 Procedure

16.1 Typical installation of the systems on timber frame and blockwork are given in Figure 5

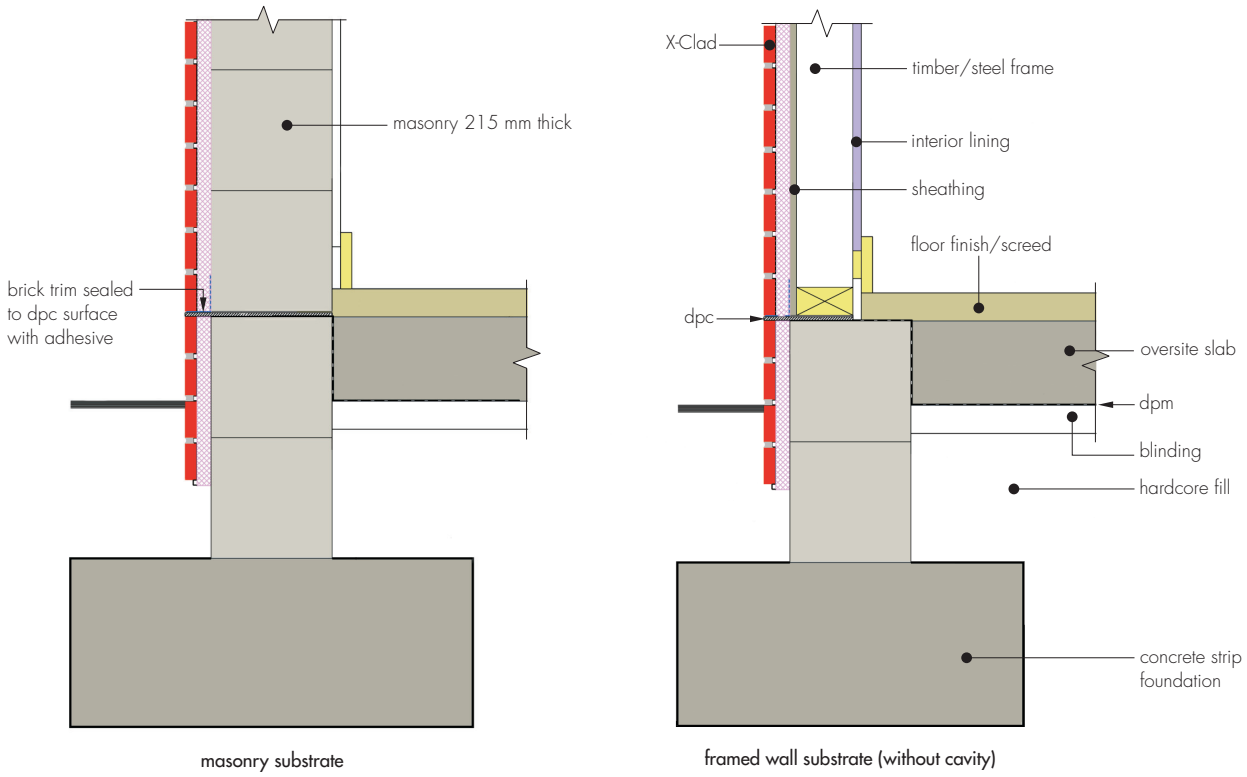
16.2 Before installation commences, the substrate to receive the panels must be flat and stable. Typically, installation starts from the outside corner working along the wall. A base channel is set at the appropriate height and fastened to the wall to provide a protective edge for the panels.

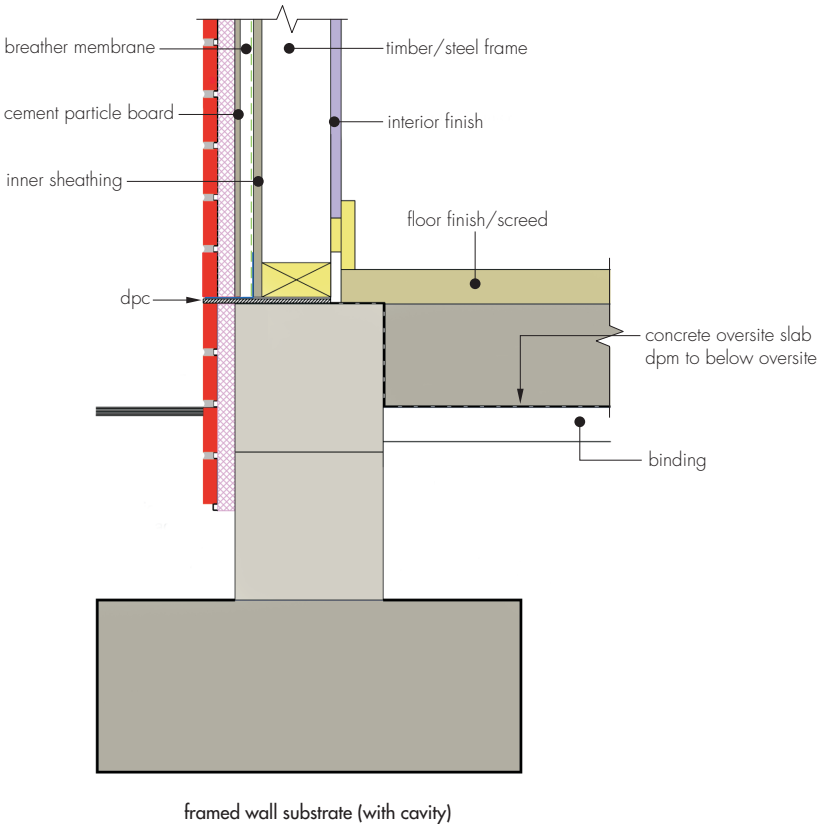
16.3 The panel with pre-formed brick slip carrier sheet is aligned with a spirit level against the substrate and fixing positions are marked (see section 6.6 and Figure 3).

16.4 The panel is fixed to the substrate with mechanical fixings. Care must be taken to ensure the fixing holes are drilled perpendicular to the surface of the panel.

16.5 At corners, the panels must overlap to prevent creating a void behind the brick slips.

Figure 5 Installation detail

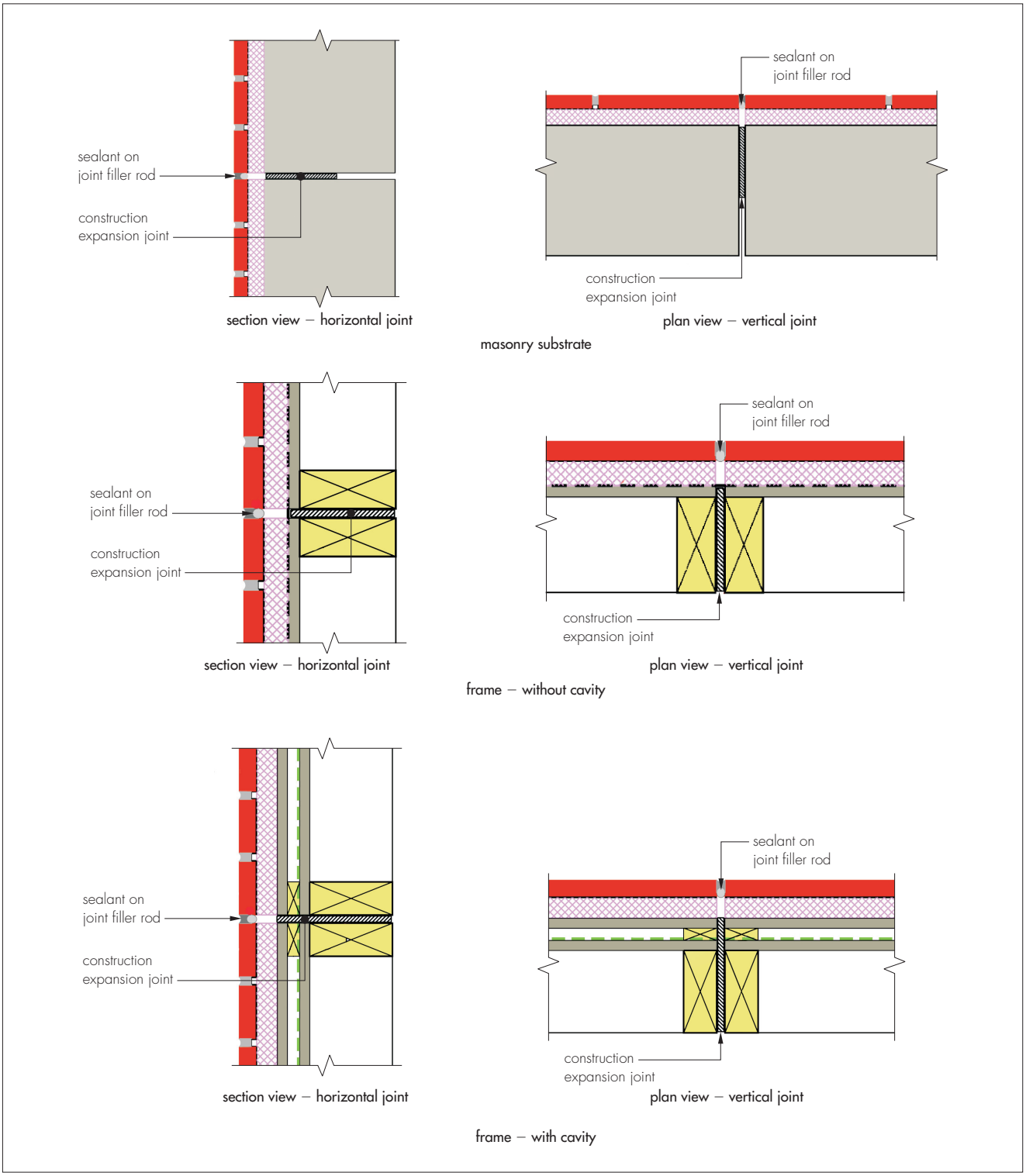




16.6 When installing onto timber-frame substrates, horizontal movement joints in accordance with BS EN 13914-1 : 2005 must be provided at every floor to accommodate vertical shrinkage of up to 6 mm in the timber frame and to follow movement joints in the substructure. With steel-frame substrates, the details for deflection at floor level and movement joints in the substructure set out by the suitably qualified experienced individual (eg structural engineer) should be applied.

16.7 Vertical movement joints must be provided at a maximum of 7 metre intervals in accordance with the Certificate holder's recommendations. The actual spacing and position of the joints should coincide with movement joints in the structure and allow for the same degree of movement (see Figure 6).

Figure 6 Typical movement joints



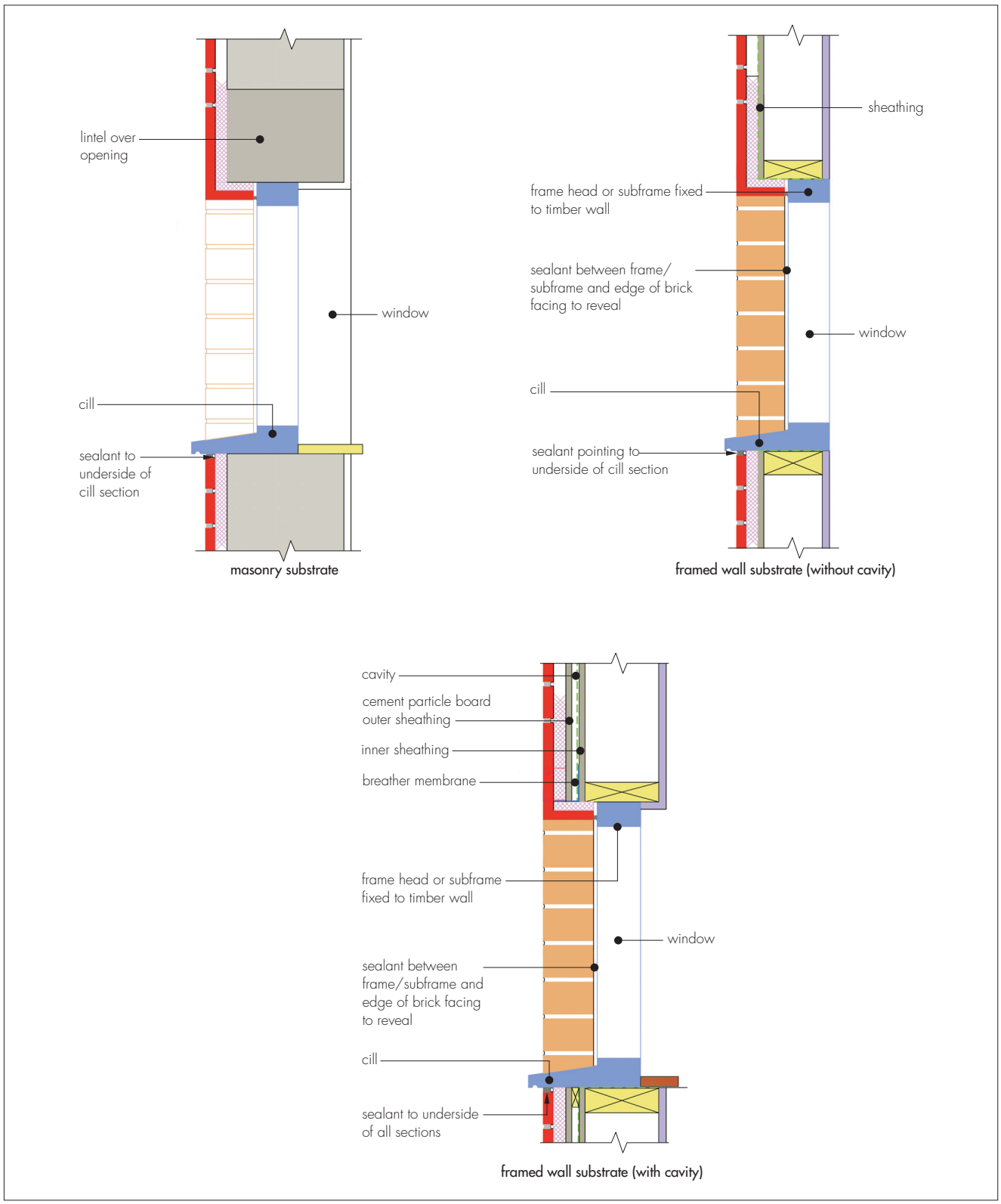
16.8 The brick slip adhesive is applied between the ribs of the carrier sheet in accordance with the Certificate holder's instructions. Care must be taken to ensure an appropriate amount of adhesive is used to hold the brick slips to the panel.

16.9 The clay brick slips are placed on horizontal bed joint ribs of the panel carrier sheet. The ribs are at 75 mm centres and the brick slips sit directly on top of the flat face and must be pressed firmly against the carrier (see Figure 1). Alignment should be checked as work proceeds.

16.10 Joints are filled with the pointing grout/mortar. Pointing should not take place at temperatures below 2°C and above 30°C. When pointing is completed, the mortar joints are tooled to the type of joint recommended by the Certificate holder and excess mortar removed with a soft brush.

16.11 To ensure weathertightness, all window and door openings must be sealed strictly in accordance with the Certificate holder's installation instructions (see Figure 7).

Figure 7 Typical window reveal


lintel over opening
window
cill
sealant to underside of cill section
masonry substrate
sheathing
frame head or subframe fixed to timber wall
sealant between frame/ subframe and edge of brick facing to reveal
window
cill
sealant pointing to underside of cill section
framed wall substrate (without cavity)
cavity
cement particle board outer sheathing
inner sheathing
breather membrane
frame head or subframe fixed to timber wall
window
sealant between frame/subframe and edge of brick facing to reveal
cill
sealant to underside of all sections
framed wall substrate (with cavity)

16.12 At the top of walls, the system must be protected by an adequate overhang or by an adequately sealed, purpose-made flashing.

16.13 Care must be taken in the detailing the system around openings and projections to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

16.14 All movement joints are sealed using urethane sealant after brick application.

17 Investigations

17.1 The manufacturing process, the methods adopted for quality control of manufactured and bought-in components, and details of the quality and composition of the materials used, were examined.

17.2 An investigation was made of the systems' data relating to:

- strength and stability
- reaction to fire
- resistance to weathering
- freeze/thaw resistance
- thermal properties
- resistance to condensation
- durability.

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Conditions of Certification

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

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